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much that is in the chapter must be mastered through the instructor's exposition, but we must make proper recognition when we meet with a treatment of vectors that continually keeps before the student the knowledge that vectors *can be used* and that makes the theorem that the curl of a gradient is zero appear as a matter of common sense (even to a pure mathematician). This is done by means of a well-explained example of a curl. The chapter closes with suggestive, rather than complete, proofs of Stokes's theorem and the formulas for small displacements, with incidental discussion of vector fields and potential.

An appendix provides a careful but broad selection and description of texts to be recommended for the student's further study in mathematics and mathematical physics.

WILLIAM DEW. CAIRNS.

## PROBLEMS AND SOLUTIONS.

B. F. FINKEL, CHAIRMAN OF THE COMMITTEE.

### PROBLEMS FOR SOLUTION.

#### ALGEBRA.

**398. Proposed by R. D. CARMICHAEL, Indiana University.**

In the equation  $x^3 + \alpha x + \beta = 0$ ,  $\alpha$  is an integer divisible by  $p^2$  and  $\beta$  is an integer divisible by  $p$ ,  $p$  being a prime number. Prove that  $\beta$  is divisible by  $p^3$  if the equation is reducible.

**399. Proposed by W. H. BUSSEY, University of Minnesota.**

A borrows from B \$1,500 and pays back \$34 a month for 63 months. If the last payment closes the account, what rate of interest has A been paying?

**400. Proposed by C. N. SCHMALL, New York City.**

Sum the series

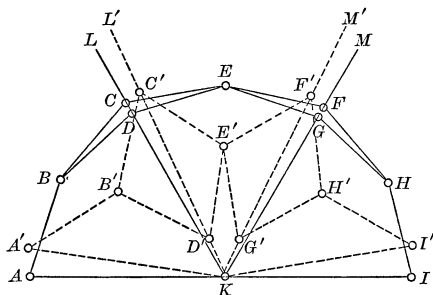
$$1 + 2x + 3x^2 + 4x^3 + \dots$$

(BROMWICH, *Infinite Series*, p. 129, ex. 1.)

#### GEOMETRY.

**427. Proposed by F. CAJORI, Colorado College.**

In S. Gross's linkage for trisection of angles, shown in the figure ( $KL'$  and  $KM'$  being the



trisectors of  $A'KI'$ ),  $C$  is fixed on  $KL$ , also  $F$  on  $KM$ ; at starting,  $C$  and  $D$  coincide, also  $F$  and  $G$ ;